

Chapter Thirteen

Construction Coordination

13.1 INTRODUCTION

Design Project Managers and Construction Group personnel work closely from project initiation through final inspection. Coordination between the staffs of these sections of the Department is key to successful project completion.

The focus of this chapter is on construction coordination, specifically coordination and support requirements between Design Project Managers and Construction Group personnel during construction. Use of the title “Design Project Manager” is a generic reference to Transportation Solutions Section Heads, Project Managers, and/or Squad Leaders who manage bridge projects. Design Project Managers usually direct Project Engineers, support staff, and/or consultants to carry out some or all of these tasks.

Coordination between Construction Group personnel and the Bridge Design Section during project initiation and design is covered in Chapter Two.

13.2 DELDOT CONSTRUCTION

Responsibilities of the Construction Group include administration of construction contracts, implementation of

quality assurance programs, and others. In this section we will discuss some of the responsibilities and organization of the design and construction sections within Transportation Solutions. Only those activities that require regular construction coordination between Design Project Managers and Construction personnel have been included in this chapter.

13.2.1 CONSTRUCTION GROUP

The Construction Group is currently divided into two regions: North and South. Each region is further subdivided into two groups. Construction is responsible for project implementation. Below is a list of the various personnel in the Construction Group that Design Project Managers coordinate with during construction, along with their typical duties.

Assistant Director, Construction - An Assistant Director heads up each construction region. The Assistant Director leads the Construction Section and is responsible for all new construction and rehabilitation projects carried out in the region. Responsibilities include the overall management, coordination, implementation, and timely completion of projects. Included in these responsibilities are quality assurance, acceptance, and payment for projects by the Department.

Group Engineer – Group Engineers oversee construction projects within their group and report directly to the Assistant Director.

Area Engineer - One or more Area Engineers may be assigned to each group, who reports directly to the Construction Engineer. The Area Engineer is responsible for management of projects assigned to him or her by the Construction Engineer. The Area Engineer insures that projects are constructed in accordance with the plans and specifications. The Area Engineer coordinates the payment of funds to the contractor for work completed. The Area Engineer directs the activities of Construction Inspectors and prepares change orders.

Construction Inspector - The Construction Inspector is the Department's on-site representative for each project and reports directly to either an Area Engineer or Resident Engineer. Depending on project complexity, a Resident Engineer may be appointed who manages a staff of inspectors. Inspectors insure quality of work and verify contractor payment requests.

Construction Inspectors typically are not authorized to approve changes to the plans. Construction Inspectors will alert the Area Engineer or Construction Engineer of any changes or unforeseen conditions that arise. The Construction Engineer, Construction Inspector, and Design Project Manager may coordinate directly.

13.3 MATERIALS AND RESEARCH SECTION

The Materials and Research (M&R) Section has statewide responsibilities for supporting the various construction sections with quality assurance.

M&R is responsible for ensuring that materials and fabricated items brought on site for use in the project meet requirements of the specifications. M&R ensures product quality by assigning inspectors to various plants that supply material. These include concrete plants, asphalt plants, steel fabricators, pre-cast concrete plants, and others. M&R also conducts on-site testing of aggregates and soils to ensure compaction levels and takes on-site samples of material deliveries back to the lab for quality assurance analysis.

13.4 DESIGN

The Design Division includes the Quality and Design Support sections. These sections include the following:

- **The Sediment and Stormwater Management Group** reviews and approves every project during design and construction for compliance with Delaware Code pertaining to erosion, sediment control, and stormwater management. They operate under the authority of a Memorandum of Agreement (MOA) between the Department of Natural Resources and Environmental Control and the Department of Transportation.
- **The Construction and Maintenance Technology (CONTECH) group** conducts quality assurance inspections of construction and maintenance contracts from an administrative standpoint. The CONTECH group researches and provides training on new methods, procedures, and specifications; coordinates modification of existing specifications to achieve better products, and provides feedback to Project Development on design issues

arising during construction. Once construction projects are completed, the CONTECH Group conducts final inspections.

13.5 SAFETY SECTION

The Safety Section is responsible for review and approval of Maintenance of Traffic (MOT) control plans. The section insures that plans are prepared in accordance with the *DelDOT Traffic Controls* manual and are responsible for publishing and updating the manual.

The Safety Section must approve changes to Design MOT plans proposed during construction. The section also performs field inspections of MOT to assess operational safety concerns and require changes be made if necessary.

13.6 DELDOT CONSTRUCTION MANUAL

The *DelDOT Construction Manual* is an important reference tool. Design Project Managers should refer to this manual for standard practices for contract administration, and typical construction methods.

13.7 STANDARD SPECIFICATIONS

DelDOT Standard Specifications are an integral part of every construction bid package and should be adhered to unless superseded by another contract document.

Standard Specifications contain standard information used for most projects including construction materials, measurements and payment. Design Project

Managers and construction personnel must be familiar with the requirements and procedures of the *Standard Specifications*.

13.8 NEW PRODUCT EVALUATION

Occasionally, new products are identified that may have the potential to improve current methods and or reduce cost. These products should be referred to M&R Section for review prior to their acceptance and use. Contractors, manufacturers, suppliers, consultants, or Department personnel may request evaluation.

13.9 CONSTRUCTION SUPPORT

Project handoff typically takes place at the time of contract award. During project handoff, primary responsibility for project administration transfers from Project Development to Construction. However, implementing the project is still a team effort, with nearly every division of the Department still involved. The Design Project Manager continues to be involved by assisting with:

- Plan clarifications and intent
- Plan changes
- Unforeseen conditions
- Approval of shop and working drawings

13.9.1 PRECONSTRUCTION MEETING

Design Project Managers should attend the Preconstruction meeting. The Construction Engineer or Area Engineer typically runs the Preconstruction meeting. This is an important meeting, which gets the project started. Design Project Managers

attending the Preconstruction meeting should be familiar with the plans and specifications so they can answer questions that arise, or take notes to reply to questions at a later date.

Any change to the Department's typical lines of communication should be discussed and agreed to during this meeting.

13.9.2 KEY CONSTRUCTION ACTIVITY MEETINGS

Numerous scheduled and unscheduled meetings typically take place during the course of construction. Design Project Managers should attend these meetings when requested by construction personnel. Typical meetings that Design Project Managers attend are test pile driving, pre-deck pour, and semi-final inspection. When requested, they may also assess unforeseen conditions, assess plan conflicts, or answer questions in plan interpretation.

13.9.3 TEST PILE DRIVING

Foundation design is based on on-site testing and generally accepted principles of geotechnical engineering. These provide the basis for design of foundations, but soil properties still need to be verified during construction. During pile design, Design Project Managers face an additional unknown concerning the type of equipment the contractor will use to drive piles. Per the Department's test pile specification, contractors must submit a wave equation analysis based on their chosen driving equipment to the district for approval before driving. Construction provides the wave equation to the Design Project Manager for review and approval. Immediately after pile driving, Construction provides the Design Project Manager with the pile driving record and dynamic analysis results for approval.

Design Project Managers use this information for approval of driving criteria and production pile order length.

13.9.4 PRE-DECK POUR MEETING

The Design Project Manager attends the pre-deck pour meeting. The pre-deck pour meeting serves to review the Contractor's plan to place the deck. Important points to discuss are the planned placement rate, location, sequencing of the pour, and the ability of the contractor to keep the mix plastic until completion of the pour. Contingency plans should be discussed pertaining to where the contractor should stop the pour if he or she falls behind in his placement rate, has equipment problems, or encounters inclement weather. Detailed requirements for the placement of concrete bridge decks is contained in DelDOT Standard Specifications Section 602.20.

13.9.5 SEMI-FINAL INSPECTION

Design Project Managers should attend this meeting to assist in reviewing the nearly completed project. During this meeting, final items that the contractor needs to address are listed.

13.9.6 UNFORESEEN OR CHANGED CONDITIONS

Design Project Managers should be contacted immediately whenever conditions in the field do not match those shown on the plans. These include environmental, physical, material, or structural conditions that may arise. Design Project Managers will assist in assessing the condition and direct changes that may be required.

13.9.7 CONSULTANT CONSTRUCTION SUPPORT

Consultants who prepare design plans are typically retained to assist during construction. A separate contract between the Department and consultant for construction services should be prepared for this purpose. Typical assistance consultants provide during construction include:

- Attendance and support at pre-bid and preconstruction meetings.
- Assistance in plan interpretation.
- Review of working drawings.
- Preparation of plan revisions.
- Analysis and recommendations of unforeseen conditions.

Occasionally, consultants also provide more extensive construction support such as:

- On-call assistance with construction inspection and acceptance.
- Review of contractor plan change proposals.
- Attendance and support at progress meetings and/or public meetings.

Consultant assistance needs to be provided in a timely manner to ensure that the project is not delayed and that the Department is responsive to the contractor.

13.9.8 AS-BUILT PLANS

During construction, not all details of the design plans may be followed exactly. Reasons for plan changes may be unforeseen or changed conditions in the field, plan revisions, value engineering proposals, deleted work, construction errors, etc.

As-builts are master sets of plans initially created and maintained by the inspection

staff during construction. As changes occur, this set of plans is updated to reflect the actual as-built condition. Once the project is completed, the as-builts are forwarded back to the Design Project Manager. The Design Project Manager or his representative transfers as-built information onto the Department's file copies of the plans, which are then archived to serve as a permanent record of the bridge.

Marking as-builts is done in red in the field and later transferred to the electronic version of the plans. Once all as-built information is transferred to the electronic version of the plans, a final raster image of the plans is created (typically cal files). These files are then archived for future reference in the Department's database.

13.10 CONTRACTOR SUBMISSIONS

Contractors must make material and working drawing submissions as required by Section 100 of the Standard Specifications. A working drawing submittal process flow chart is shown in the Standard Specifications, which indicates the flow of working drawings, number of copies required, and time limit for review. In some cases, the construction group may revise the standard submission flow to accelerate the project.

In most cases, the Designer will not communicate directly with the contractor; however, there are exceptions when direct communication between the contractor and Designer is in the best interest of the Department. Designers should normally communicate with the contractor either through or in the presence of construction group personnel. Direct communication between the Designer and contractor shall only take place when authorized by the

construction group. When the construction group is not a party to direct communication between the Designer and contractor, the Designer must provide the construction group with a summary of the discussion.

13.10.1 WORKING DRAWING SUBMISSIONS

Designers are responsible for ensuring that working drawing submittals are in general conformity with the plans and specifications. Designers check to ensure that member sizes are accurate and do a cursory check of structural calculations. In some cases, contractors submit recommended changes to the plans due to constructability or material availability, which Designers must assess. Designers write comments on all copies of submissions in red and return them to the construction group. Designers stamp submissions in accordance with the Standard Specifications Section 100. One copy of stamped submissions is kept in the Bridge Design files.

Some working drawings include structural materials to be fabricated. Once approved by the Designer, the required number of stamped copies of these plans shall be forwarded to the Materials and Research Engineer and the remainder sent back to the construction group. The Materials and Research Engineer then arranges for shop inspection of fabricated members.

Designers shall make review of contractor submissions a high priority, insuring that these submissions are reviewed and returned to the construction group as soon as possible but in no more than 30 days.

When a submission is not approved, the Designer should immediately alert

construction group personnel, since this may affect the construction schedule. Designers should avoid the following:

- Making major changes to contractor submissions because this tends to decrease the contractor's responsibility.
- Making changes that are inconsistent with the contract documents.

When Designers make changes to a submission, the construction group should be informed so that the change can be quickly coordinated with the Contractor.

13.10.2 MATERIAL SUBMISSIONS

Product-specific submissions, including concrete mix designs, are forwarded directly from the construction group to the Materials and Research Engineer for review. Designers do not stamp these submissions. If a materials submission is mistakenly sent to the Designer, it should be forwarded to the Materials and Research Engineer.

In all cases, the construction group Engineer shall be copied on submission transmittals and correspondence initiated by the Designer.

13.11 PLAN CHANGES

Occasionally, contract requirements may have to be changed during construction for reasons including the following:

- Unforeseen physical conditions
- Existing structures not built per original plans
- Structural condition differing from those in inspection reports.
- Features missed during survey
- Utility conflicts

- Subsurface irregularities
- Political requests

Depending on the extent and complexity of the change, a plan revision or field change may be required. All change orders shall be reviewed and approved by the Designer. Situations involving structural changes, public safety, and/or more complex problems are referred from the construction group to the Design Project Manager. Design Project Managers should consult with construction group personnel before making a final decision related to plan changes.

13.11.1 PLAN REVISIONS

Plan revisions are required for any changes to the plan, profile, or features of the project.

Design Project Managers will take the lead in obtaining approval for the change and preparing plan revisions. Before implementing changes, the Design Project Manager should contact the Finance Section to discuss the change and verify whether funding is available.

Design Project Managers will make revisions to appropriate sheets of the plans along with computation of new quantities. Design Project Managers should coordinate with the construction group on the required number of sheets to forward. Design Project Managers will send written justification to Finance indicating the changes required and requesting any increase or decrease in funding.

Plan revisions shall be marked on the plans as indicated in the CADD Manual.

13.11.2 FIELD CHANGES

Field changes are relatively minor changes in which a plan revision is not required. In most cases the construction group will coordinate field changes with the Design Project Manager. The construction group is responsible for coordinating any funding needs with Finance. The changes made will be marked on the as-built plans.

13.11.3 COST ANALYSIS

Changes to project plans may require a cost analysis to be performed if the scope and complexity of the work has changed and is not representative of the contract price. When requested by the construction group, Design Project Managers will perform a cost analysis for use in determining a fair price for the work required.

Typically, the construction group also negotiates with the contractor on the price for additional work. When the contractor and Design Project Manager's estimated costs vary considerably, the construction group will continue to negotiate with the contractor and, if necessary, pay for the work by force account.

13.11.4 CONSTRUCTION CLAIMS

Design Project Managers may be asked to support the construction group in construction claim hearings held with the contractor. For this reason, the Design Project Manager shall insure that accurate records are kept to enable fair evaluation of the claim.

